

CLAIMS

We claim:

1. A computer system comprising:

a processor having first and second execution cores and a check unit, the first and second execution cores to process instructions independently when the processor is in a split mode and to process identical instructions in lock step when the processor is in a redundant mode, and the check unit to compare results from the first and second execution cores when the processor is in redundant mode; and

a non-volatile memory in which is stored a recovery routine that switches the processor to split mode when the check unit detects an error, identifies uncorrupted processor state data from at least one of the execution cores, and initializes the first and second execution cores with the identified processor state data.

2. The computer system of claim 1, wherein the error recovery routine returns the processor to the redundant mode.

3. The computer system of claim 1, wherein the error recovery routine identifies uncorrupted processor state data in selected storage structures associated with each execution core, copies the uncorrupted processor state data to a specified memory location, and reconciles the copied processor state data, when the processor enters split mode.

4. A method for handling soft errors in a processor capable of operating first and second execution cores in redundant and split modes, the method comprising:

detecting a soft error when the processor is operating in the redundant mode;

executing an error recovery routine on each execution core to save uncorrupted data from storage structures associated with the first and second execution cores, wherein the error recovery routine is stored in a non-volatile memory; and

recovering processor state data from the saved uncorrupted data.

5. The method of claim 4, further comprising:

reconciling the saved, uncorrupted data to recover the processor state data; and

initializing the first and second execution cores using the recovered processor state data.

6. A machine readable medium on which are stored instructions that are executable by a dual execution core processor to implement a method for recovering from soft errors, the method comprising:

switching the processor to operate the dual execution cores independently when a soft error is detected;

executing an error recovery routine on each of the execution cores to recover a minimum set of processor state data from uncorrupted processor state data, wherein the error recovery routine is stored in a non-volatile memory; and

initializing each of the dual execution cores, using the minimum set of processor state data.

7. The machine readable medium of claim 6, wherein initializing each of the dual execution cores comprises:

switching the processor to operate the dual execution cores in lock step; and

copying the minimum set of processor state data to each of the dual execution cores.

8. A computer system comprising:

a processor having first and second execution cores that operate in lock step when the processor is in a redundant execution mode and operate independently when the processor is in a split execution mode; and

a non-volatile memory in which are stored instructions that may be implemented by the processor to implement a method for recovering from soft errors when the processor is in redundant execution mode, the method comprising:

switching the processor to split execution mode;

saving uncorrupted processor state data from each execution core to a designated memory location;

recovering a minimal set of processor state data from the saved, uncorrupted processor state data; and

initializing each execution core with the minimal set of processor state data.